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| DOBSON, DANIEL G | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/519,771 | DONATI ET AL. | |
| | Examiner | Art Unit | |
| | Daniel G. Dobson | 2609 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *17 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☒ Claim(s) *16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1. The abstract of the disclosure is objected to because it exceeds 150 words. Correction is required. See MPEP § 608.01(b).

### *Claim Objections*

2. Claim 16 recites the limitation "said second waveguide" in lines 3-4 and "said second photodiode circuit" in line 5. There is insufficient antecedent basis for these limitations in the claim.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 23-25** are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,710,561 to Logan, Jr., (*Logan.*)

As to **Claim 23**, *Logan* discloses a method for transmitting millimeter waves (Col. 1, ll. 14-17) comprising the step of

generating optical signals (Fig 3A, lasers 1 and 2 generate signals of frequency $V_1$ and $V_2$);

characterized by the steps of generating modulating signals corresponding to useful information to be transmitted (Fig. 3A, RF Input corresponding to the baseband signal); and

applying said modulating signals to said optical signals (Col. 5, ll. 59-67.)

As to **Claim 24**, *Logan* discloses a method for receiving millimetric waves (Col. 1, ll. 14-17) characterized by the steps of

generating optical signals by means of a laser circuit (Fig 5A, lasers 1 and 2 generate signals of frequency $V_1$ and $V_2$);

receiving, by means of a photodiode circuit connected to said laser circuit millimetric waves having a modulating component (Fig. 5A, 46; Col. 8, ll 25-41.)

As to **Claim 25**, *Logan* further discloses a method for receiving millimetric waves characterized by the additional step of

demodulating said modulating component by means of a demodulating circuit (Col. 8, ll 25-41, the baseband signal is extracted from the millimetric wave, hence it is demodulated.)

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1,2,6,7,11** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,710,651 to Logan, Jr. (*Logan*,) in view of U.S. Patent 5,998,781 to Vawter et al. (*Vawter.*)

As to **Claim 1**, *Logan* discloses a device for transmitting millimetre waves comprising (Col. 1, ll. 14-7):

a laser circuit able to generate optical signals (Fig. 3A, 30, Laser #1);

a photodiode circuit (Fig. 3A, 46, photodiode) connected to said laser circuit by means of a waveguide (Fig. 3A, connected to laser by fiber (12)) able to convert said optical signals into electromagnetic signals to be transmitted in the form of millimetre waves (the optical signals converted to an electrical millimeter-wave signal; Col. 5, ll. 15-20);

characterized by an amplifier circuit (Fig. 3A, 60, amplitude modulator) associated to said waveguide and able to apply modulation signals to said optical signals (Col. 5, l. 67-Col. 6, l. 1.)

*Logan* does not expressly disclose that the device is integrated. *Vawter* discloses an integrated device for generating a signal at a millimeter-wave frequency (Col. 1, ll. 12-7.)

*Logan* and *Vawter* are from the same art with respect to millimeter wave generation. Therefore they are analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to integrate the millimeter wave transmitter disclosed by *Logan*. The suggestion/motivation would have been to improve cost and performance.

As to **Claim 2**, *Logan* further discloses that said amplifier circuit is able to modulate in amplitude said optical signals (Col. 5, ll. 59-60.) The suggestion/motivation is the same as that used in the rejection for claim 1.

As to **Claim 6**, *Logan* discloses a device for receiving millimeter waves (Fig. 5A), characterized by:

a laser circuit able to generate optical signals (Fig. 5A, 30);

a photodiode circuit (Fig. 5A, 46) connected to said laser circuit by means of a waveguide (Fig. 5A, 12, 12a), and comprising

receiving elements able to receive millimetric waves (Fig. 5A, 16);

circuit elements able to extract said millimetric wave (Fig. 5A, photodiode.)

*Logan* does not expressly disclose that the device is integrated. *Vawter* discloses a system where lasers, photodiodes and wave-guides may be integrated.

*Logan* and *Vawter* are from the same art with respect to millimeter wave generation. Therefore they are analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to integrate the millimeter wave receiver disclosed by *Logan*. The suggestion/motivation would have been to improve cost and performance.

As to **Claim 7**, *Logan* further discloses that said millimetric waves comprise a modulating component (the millimetric waves are modulated at a baseband frequency of $f_m$, Col. 8, ll. 25-6) and in that said circuit elements comprise demodulating elements able to extract said modulating component (photodiode has cut-off frequency is below the carrier frequency so the output contains only the baseband signal, Col. 8, ll. 38-41.) The suggestion/motivation is the same as that used in the rejection for claim 6.

As to **Claim 11**, *Logan* further discloses that said demodulating elements comprise circuit elements able to effect an optical beat (Fig. 5B, the optical signals have a frequency $V_1$ and $V_2$. The beat frequency (V2-V1) is the same as that of the received millimeter wave signal ($f_{LO}$.) with the optical signals generated by said laser circuit and to generate electrical signals representative of said modulation component (Col. 8, ll. 38-41.) The suggestion/motivation is the same as that used in the rejection for claim 6.

7. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,710,651 to Logan, Jr. and U.S. Patent 5,998,781 to Vawter et al. as applied to claim 11 above, and further in view of U.S. Patent 4,156,135 to Miller, Jr. et al., (*Miller*.)

As to **Claim 16**, *Miller* discloses that when mixing two frequencies in a detector, it is desirable to bias or drive the detector to its non-linear region.

*Logan*, *Vawter*, and *Miller* are from the same art with respect to communications. Therefore, they are analogous art.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to bias and/or use an amplifier to drive a detector when mixing two frequencies in that detector. The suggestion/motivation would have been to achieve electronic heterodyning while overcoming the problems of noise and saturation (Col. 1, ll. 23-4.)

8. **Claims 3-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,710,651 to Logan, Jr., and U.S. Patent 5,998,781 to Vawter et al., as applied to claim 1 above, and further in view of U.S. Patent 5,287,212 to Cox et al., (*Cox*.)

As to **Claim 3**, *Cox* discloses modulating elements (Fig. 3, 141, 142, 143) able to modulate said optical signals by means of a current proportional to said modulation signals (Col. 3, ll. 45-7.)

*Logan*, *Vawter*, and *Cox* are from the same art with respect to optical communications. Therefore they are analogous art.

At the time of the invention it would have been obvious to operate an amplifier circuit, as disclosed by *Logan* and *Vawter*, in a manner where the optical signals are proportional to the modulation current (as taught by *Cox*.) The suggestion/motivation would have been to increase link transfer efficiency, noise figure, dynamic range, and signal to noise ratio (*Cox*, Col. 3, ll. 55-7.)

As to **Claims 4** and **5**, *Logan* further discloses that the modulating elements are digital or analog (Col. 7, ll. 63-5.) The suggestion/motivation is the same as that used in the rejection for claim 3.

9. **Claims 8** and **10** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,710,651 to Logan, Jr., and U.S. Patent 5,998,781 to Vawter et al., as applied to claim 7 above, and further in view of U.S. Patent 4,759,081 to Witters, (*Witters*.)

As to **Claim 8**, *Logan* discloses detecting elements able to detect said modulating component (Col. 8, ll. 38-41.)

*Logan* does not expressly disclose biasing element able to bias said photodiode circuit in conditions of nonlinearity. *Witters* discloses an optical

receiver with a bias circuit (Fig. 3.) The circuit biases the photodiode into the non-linear operating region (Col. 1, ll. 34-6.)

*Logan*, *Vawter*, and *Witters* are from the same art with respect to communications. Therefore, they are analogous art.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to bias a photodiode in the nonlinear region. The suggestion/motivation would have been to increase the sensitivity of the dynamic range (Col. 1, ll. 15-19.)

As to **Claim 10**, *Witters* further discloses that said biasing elements are able to bring to slight direct bias said photodiode circuit (Col. 1, l. 40) by means of a voltage of 200 to 300mV.

*Witters* discloses that it is desirable to forward bias the photodiode. Given this, it would have been obvious for a person of ordinary skill in the art to calculate the amount of voltage needed to achieve this result (MPEP 2144.05.) Furthermore, the suggestion/motivation is the same as that used in the rejection for claim 8.

10. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,710,651 to Logan, Jr., U.S. Patent 5,998,781 to Vawter et al., and U.S. Patent 4,759,081 to Witters as applied to claim 8 above, and further in view of U.S. Patent 4,156,135 to Miller, Jr. et al., (*Miller.*)

As to **Claim 9**, *Miller* discloses that when mixing two frequencies in a detector, it is desirable to bias or drive the detector to its non-linear region.

*Logan*, *Vawter*, *Witters*, and *Miller* are from the same art with respect to communications. Therefore, they are analogous art.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to bias and/or use an amplifier to drive a detector when mixing two frequencies in that detector. The suggestion/motivation would have been to achieve electronic heterodyning while overcoming the problems of noise and saturation (Col. 1, ll. 23-4.)

11. **Claims 12, 17,** and **18** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,348,683 to Verghese et al. (*Verghese*) in view of U.S Patent 5,703,974 to Sasaki et al. (*Sasaki.*)

As to **Claim 12**, *Verghese* discloses a device for the reception and transmission of millimetric waves (transceiver for transmitting and receiving high frequency radiation, Abstract) characterized by

at least one laser circuit able to generate optical signals (Fig. 1A, 16, 18);

a first photodiode circuit (Fig. 1A, 12) connected to said at least one laser circuit by means of a first waveguide (Fig. 1A, 22) and having transmission elements able to transmit optical signals in the form of millimetric waves (Col. 4, ll. 9-10); and

a second photodiode circuit (Fig. 1A, 14) connected to said at least one laser circuit by means of a second waveguide (Fig. 1A, 18) and having receiving elements able to receive millimetric waves (Fig. 1A, 18-20.)

*Verghese* does not expressly disclose that the device is integrated. *Sasaki* teaches that it is advantageous to integrate various optical components, such as lasers, amplifiers, and waveguides .

*Verghese* and *Sasaki* are from the same art with respect to optical communication. Therefore, they are analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to integrate a device as disclosed by *Verghese*. The suggestion/motivation would have been to reduce size and to allow connection of components in a low-loss manner without optical fibers (Col. 1, ll. 17-21.)

As to **Claim 17**, *Verghese* further discloses that said first photodiode and said second photodiode are connected in parallel to antenna devices (Fig. 1A, 1B, 1st photodiode is connected to waveguide 22 and antenna 28, 2nd photodiode is connected to waveguide 24 and antenna 26.) The suggestion/motivation is the same as that use in the rejection for claim 12.

As to **Claim 18**, *Verghese* further discloses that at least one laser circuit (Fig. 1A, lasers 16 and 18) comprises coupling elements able to couple said laser circuit to said first and to said second waveguide (Fig. 1A, 20, the laser circuit is coupled to both waveguides (22, 24.)) The suggestion/motivation is the same as that use in the rejection for claim 12.

12. **Claims 13, 14, 19-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,348,683 to Verghese et al. and U.S Patent 5,703,974 to Sasaki et

al., as applied to claim 12 above, and further in view of U.S. Patent 5,710,651 to Logan, Jr.

As to **Claim 13**, *Logan* discloses an amplifier circuit (Fig. 3A, 60) able to apply modulating signals to said optical signals (Col. 5, ll. 59-57.)

*Verghese*, *Sasaki*, and *Logan* are from the same art with respect to optical communications. Therefore, they are analogous art.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an amplifier circuit disclosed by *Logan*, connected to the output of the laser circuit disclosed by *Verghese*. The suggestion/motivation would have been to overcome the bandwidth limitations of electronic mixers (Col. 1, l. 41.)

As to **Claim 14,** *Logan* further discloses that said amplifier circuit is able to modulate in amplitude said optical signals (an intensity amplitude modulator is used, Col. 5, l. 59.) The suggestion/motivation is the same as that used in the rejection for claim 13.

As to **Claim 19**, *Verghese* discloses a module for transmitting millmetric waves (Col. 2, l. 16, Col. 6, l. 21-22) comprising

a device having at least one laser circuit able to generate optical signals (Fig. 1A, lasers 16 and 18);

*Logan* discloses a device characterized by a modulating circuit able to generate modulating signals (*Logan*, Col. 5, ll. 59-67); and in that said device comprises

a modulating element (Fig. 3A, 60) able to apply said modulation signals to said optical signals (Col. 5, ll. 59-67.)

*Verghese* does not expressly disclose a modulating circuit. *Logan* does, as discussed above. *Verghese* and *Logan* do not expressly disclose that the device is integrated. *Sasaki* suggests the desirability of integrating various optical devices.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a modulator in a device disclosed by *Verghese*. It would have also been obvious to integrate the entire package. The suggestion/motivation is the same as that used in the rejections for claims 12 and 13.

As to **Claim 20**, *Verghese* further discloses that

said optical signals comprise at least two optical modes (Col. 6, ll. 14-6; 850nm and a tunable source centered at 852nm); and in that

said millimetric waves are generated by beat between said optical modes (Col. 5, ll. 47-52.) The suggestion/motivation is the same as that used in the rejection for claim 19.

As to **Claim 21**, *Verghese*, *Sasaki*, and *Logan*, disclose

an integrated device (as taught by *Sasaki*)

at least one laser circuit able to generate optical signal (*Verghese*, Fig. 1A, lasers)

a photodiode circuit connected to said laser circuit and able to receive millimetric waves (Fig. 1A, 14) having a modulating component (Col. 5, ll. 57-62)

a demodulation circuit connected to said photodiode circuit and able to reveal said modulating component (Fig. 1A, 40, 42, 44). The suggestion/motivation is the same as that used in the rejection for claim 19.

As to **Claim 22**, *Verghese* and *Logan* disclose a module for the transmission and reception of millimetric wave characterized by

a modulation circuit able to generate modulating signals (*Logan*, Fig. 3A, RF input);

a device having at least one laser circuit able to generate optical signals (Fig. 3A, lasers 1 and 2);

a modulating element able to apply said modulating signals to said optical signals (Fig. 3A, 60);

a photodiode circuit connected to said least one laser circuit and able to receive millimetric waves having a modulating component (Fig. 5A, 46); and by

a demodulating circuit connected to said photodiode circuit and able to reveal said modulating component (Col. 8, ll. 38-41.)

*Verghese* does not expressly disclose a modulating circuit. *Logan* does, as discussed above. *Verghese* and *Logan* do not expressly disclose that the device is integrated. *Sasaki* suggests the desirability of integrating various optical devices.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a modulator in a device disclosed by *Verghese*. It would have also been obvious to integrate the entire package. The suggestion/motivation is the same as that used in the rejections for claims 12 and 13.

13. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,348,683 to Verghese et al. and U.S Patent 5,703,974 to Sasaki et al., as applied to claim 12 above, and further in view of U.S. Patent 4,156,135 to Miller, Jr. et al. (*Miller.*)

As to **Claim 15**, *Miller* discloses that when mixing two frequencies in a detector, it is desirable to bias or drive the detector to its non-linear region.

*Verghese*, *Sasaki*, and *Miller* are from the same art with respect to optical communications. Therefore, they are analogous art.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to bias a detector in a nonlinear fashion for use in a device disclosed by *Verghese*. The suggestion/motivation would have been to achieve electronic heterodyning while overcoming the problems of noise and saturation (Col. 1, ll. 23-4.)

14. **Claim 26** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,348,683 to Verghese et al., U.S Patent 5,703,974 to Sasaki et al., and U.S. Patent 5,710,651 to Logan, Jr. et al., as applied to claims 19, 21, and 22 above, and further in view of U.S. Patent 5,687,261 to Logan, (*Logan II.*)

As to **Claim 26**, *Verghese*, *Sasaki*, and *Miller* disclose a module for transmitting and receiving millimetric waves as discussed above. *Logan II* discloses that it is advantageous to use millimeter-wave frequencies in a wireless local area network (Col. 10, ll. 17-21.) *Logan II* further states that a stable heterodyne laser generator allows practical use of photonic up-conversion and down-conversion for millimeter wave signals (Col. 10, ll. 26-8.)

All references are from the same art with respect to communications. Therefore, they are analogous art.

At the time of the invention it would have been obvious for a person of ordinary skill in the art to use a millimeter-wave transmitter/receiver in a local area network. The suggestion motivation would have been to take advantage of the small antenna size and atmospheric absorption associated with millimeter-wave transmission (Col. 10, ll. 20-5.)

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel G. Dobson whose telephone number is (571) 272-9781. The examiner can normally be reached on Mon. - Fri. 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Derrick Ferris can be reached on (571) 272-3123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/dgd/

9/18/02

DERRICK W. FERRIS
SUPERVISORY PATENT EXAMINER